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EXAMINER
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WERNER, BRIAN P

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 12/23/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/056,497

Applicant(s)

JAVIDI, BAHRAM

Examiner

Brian P. Werner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-82 is/are pending in the application.
- 4a) Of the above claim(s) 35,42-53 and 66-82 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-34,36-41 and 54-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4&6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of Group I, species A and C in Paper No. 10 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Of pending claims 1-82, claims 35, 42-53 and 66-82 are withdrawn from further consideration as non-elected, and claims 1-34, 36-41 and 54-65 are examined herein.

### ***Drawings***

2. The drawings were received on November 3, 2003. These drawings are acceptable.

### ***Specification***

3. The disclosure is objected to because of the following informalities: Page 7 of the specification refers variously to figures 4 (e.g., figure 4A, figure 4B, etc.). However, it appears that figures 5 were the intended figures of reference because they depict the subject matter described. Appropriate correction is required.

***Claim Objections***

4. The following quotations of 37 CFR § 1.75(a) is the basis of objection:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

5. Claims 59 and 65 are objected to under 37 CFR § 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery. Regarding 59, it is not clear what is meant by "another array", when a first "array" was never claimed. It will be assumed that "an array" was the intended language. Regarding 65, it is not clear what is meant by "another plurality of arrays", when a first "plurality of arrays" was never claimed. It will be assumed that "a plurality of arrays" was the intended language.

***Claim Construction***

6. The examiner shall interpret the claimed terminology listed below as follows:

Claimed Terminology	Interpretation
"virtual"; e.g., at claim 54, line 2.	Not real; computer generated; computer synthesized.
"virtual three-dimensional object"; e.g., at claim 54, line 2.	A computer generated (or synthesized) object having three dimensions (e.g., width, height, depth).

Any disagreement with the examiner's claim construction should be so stated on the record in the subsequent response, and accompanied by the applicant's own interpretation of the claimed terminology in order to clarify the record.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5, 7 and 10-12, are rejected under 35 U.S.C. 102(e) as being anticipated by Gottfried et al. (US 6,483,644 B1).

As a precursor to the rejection, a brief summary of the Gottfried reference, as it pertains to the claimed subject matter, will be described. Gottfried captures a perspective image sequence (e.g., figure 5b) and interweaves the elemental perspective images (e.g., figure 3) for display. The interweaving process is a digital process, whereby the interwoven image is stored in a memory array ("computer memory as an array" at column 4, line 52). In one of the preferred embodiments, there are nine elemental images ("three by three array of perspective views" at column 6, line 17), from which each image is converted to a desired resolution, divided into cells having 3X3 elements (or pixels), where every third pixel in both the horizontal and vertical direction are extracted for placement into the interwoven image at a corresponding position (column 6, lines 25-46). The process is repeated for the remaining elemental images, where the final interwoven image has individual cells,

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each having 3X3 elements taken from each elemental image (e.g., as depicted in figure 3).

Regarding **claims 1-4 and 12**, Gottfried discloses:

extracting information corresponding to periodic pixels from an array of pixels (e.g., "pixels are selected as every third pixel horizontally and vertically" at column 6, line 30) having an elemental image array ("each view" at column 6, line 26, has an elemental image array; i.e., "elements from each perspective view ..." at column 2, line 51) of a three-dimensional object formed thereon ("objects in the scene" at column 5, line 23; as depicted in figures 5-6, the elements of each elemental image comprises objects in a scene); and

processing the information (this limitation is met in several ways: for example, first, the "interweaving process" at column 6, line 5 is a processing of the image information; second, "digital image manipulation/compositing" is disclosed at column 6, line 47; third, the image can be "enlarged" by processing the image information at column 10, line 33; finally, the image information is processed for projection display at column 10, line 52-65) to reconstruct an image from a view angle of the 3D object (the entire purposes of the aforementioned processing taught by Gottfried is to reconstructed an image from a selected view angle, as depicted in figure 8), the periodic pixels defining the view angle (the periodic pixels, once processed by the aforementioned "interweaving process", are stored in a "computer memory as an array of cells, each cell subdivided by view elements" at column 4, line 51; this is depicted in figures 3-4; each

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view element is a pixel that represents a view from a particular view angle; again, this is depicted in figure 8).

Regarding **claim 5**, digital image processing is disclosed to improve image quality ("digital image manipulation" at column 6, line 46; "resolution of the interwoven image is increased" at line 57).

Regarding **claim 7**, the reconstructed image is recorded (the interwoven image is initially recorded in a "computer memory" at column 4, line 51; in addition, it can be printed out at column 6, line 58-59, or it can be recorded on "digital film" at column 10, line 31, or "stored electronically" and "projected" at column 10, lines 53-65)

Regarding **claims 10 and 11**, the reconstructed image is display through an LCD (column 10, lines 55-64).

9. Claims 22, 24-29 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by McCormick et al. (US 6,535,629 B2).

Regarding **independent claim 22**, McCormick discloses:

an array of lenses receiving light from a 3D object (figure 1, numerals 12, 14, 15 and 16 are each an array of lenses; any one of these meets the claim requirements) to generate an array of images of the object (figures 2-4);

a lens position to received the array of images (figure 1, numeral 19);

a detector receiving the array of images from the lens to generated digitized image information (figure 1, numeral 21; "CCD" at column 3, line 3); and

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a processor connected to the detector processing the digitized image information (figure 6, numeral 73) to reconstruct an image of the 3D object (the output of numeral 73 is a reconstructed version of the original image which is displayed at figure 1, numeral 28).

Regarding **claim 24**, the array of lenses is a micro-lens array ("microlens ... array 12" at column 2, line 40; also, "microlens array" at column 2, line 47).

Regarding **claim 25**, the microlenses are circular ("spherical" at column 2, line 41) and refractive (inherent; microlenses are "lenses", and lenses refract light by their nature; i.e., refracting light is how a lenses focuses optical energy).

Regarding **claim 26**, the lens has a magnification to project the image of the array onto the detector (as seen by the optical flow arrows in figure 1).

Regarding **claim 27**, the detector is a CCD ("CCD" at column 3, line 3).

Regarding **claim 28**, a 2D display is connected to the processor to display the image of the 3D object (figure 1, numeral 26).

Regarding **claim 29**, an LCD is disclosed ("LCD" at column 3, line 17).

Regarding **claim 34**, the 3D inverse DCT stage of McCormick (i.e., figure 6, numeral 73) is a digital image processor that, by virtue of performing inverse DCT processing to restore the image, improves the image quality (i.e., without this digital processing, the image would be terrible).



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10. Claim 54 is rejected under 35 U.S.C. 102(e) as being anticipated by Cohen et al. (US 6,222,937 B1).

Cohen discloses:

a processor (figure 5, numeral 501) for generating information of a virtual 3D object ("synthetic objects" at column 6, line 35); and

a 2D display device connected to the processor to display an image of the virtual 3D object in response to information of the virtual 3D object (figure 5, numeral 506; "render the desired image 506" at column 6, line 17).

11. Claims 54-58 and 60-64 are rejected under 35 U.S.C. 102(e) as being anticipated by Kenyon et al. (US 6,577,769 B1).

Regarding **independent claim 54**, Kenyon discloses:

a processor (figure 1, numeral 100, and equivalently at figure 12, numeral 442) for generating information of a virtual 3D object (figure 11, numeral 350; "3D game model" at column 4, line 34); and

a 2D display device (figure 1, any of numerals 102, 104, 106 and 108 have displays; a single display is depicted at figure 12, numeral 438) connected to the processor (figure 1, numeral 110, and equivalently at figure 12, numeral 444) to display an image of the virtual 3D object in response to information of the virtual 3D object ("2D ... rendering device" at column 10, line 50).

Regarding **claim 55**, an LCD is disclosed ("liquid-crystal displays" at column 10, line 53).

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Regarding **claims 56 and 57**, connection is made by the internet (figure 1, numeral 110).

Regarding **claim 58**, the 2D display is connected indirectly to the processor by a remote processor connected to the network (figure 12, numeral 406).

Regarding **claim 60**, a plurality of 2D display devices is connected (figure 1, numerals 102, 104, 106 and 108 each depict a user, and each has a display).

Regarding **claim 61**, LCD displays are disclosed ("liquid-crystal displays" at column 10, line 53).

Regarding **claims 62 and 63**, connection is made by the internet (figure 1, numeral 110).

Regarding **claim 64**, the 2D displays are connected indirectly to the processor by a remote processor connected to the network (figure 12, numeral 406; each use has a computer).

12. Claims 54 and 59 are rejected under 35 U.S.C. 102(e) as being anticipated by Sung-Wook Min et al. (article titled "Computer-Generated Integral Photography", as cited by the applicant).

Regarding **independent claim 54**, Min discloses:

a processor for generating information of a virtual 3D object ("computer generated elemental images" at figure 3); and

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a 2D display device (figure 3, "display panel") connected to the processor (as depicted in figure 3) to display an image of the virtual 3D object in response to information of the virtual 3D object ("integrated image" at figure 3).

Regarding **claim 59**, an array of lenses is positioned to received light from the display (figure 3, "lens array").

### ***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 59 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenyon et al. (US 6,577,769 B1) as applied to claims 54 and 60 above, in combination with Nakajima et al. (article titled "Three-Dimensional Display System for Medical Imaging with Computer-Generated Integral Photography").

Kenyon teaches a "2D and/or 3D graphics rendering device" (column 10, line 50), and Kenyon anticipates the use of output devices such as "liquid-crystal displays" (column 10, line 53).

Kenyon does not teach, in the case of claim 59, an array of lenses positioned to received light from the 2D display device, or in the case of claim 65, a plurality of arrays each positioned to receive light from a corresponding one of the 2D display devices.

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Nakajima discloses a display for displaying 3D images, comprising a 2D display (figure 1, "LCD") and an array of lenses positioned to receive light from the 2D display (figure 1, "Lens Array").

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the 3D display devices taught by Nakajima, in order to display the 3D images to the users of the Kenyon system, because of the "simplicity of design and the generated accuracy of projection" of the Nakajima display (i.e., see Nakajima's Abstract, last sentence).

15. Claims 30-33 and 36-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCormick et al. (US 6,535,629 B2) in combination with Lawrence et al. (US 2003/0137688 A1).

#### The McCormick Reference

McCormick teaches the transmission of the images via convention "television transmission" (e.g., column 3 line 48).

Regarding claims 33 and 41, McCormick already teaches an array of lenses (figure 1, numeral 28) positioned to receive light from the 2D display (numeral 26).

Regarding claim 37, McCormick teaches an LCD display ("LCD" at column 3, line 17).

Differences

Regarding claim 30, McCormick does not teach the display device connected indirectly to the processor by a network.

Regarding claim 31, the network is not a local or wide area network, or an intranet or the internet.

Regarding claim 32, the display is not connected indirectly to the processor by a remote processor connected to the network.

Regarding claims 36-41, McCormick does not teach a "plurality" of 2D display devices indirectly connected to the processor.

The Lawrence Reference

Lawrence teaches a system in the same problem solving area of transmitting television pictures ("digital cable network" at paragraph 0027), comprising:

regarding claims 30 and 36-41, a "plurality" of display devices (figure 1, numerals 11; a plurality of users, each having a display, is disclosed) connected indirectly to a signal source (numeral 2) by a network (the cable "network", depicted in figure 1, at numerals 7 and 9).

Regarding claim 31, the network is a local or wide area network (e.g., a cable network is a wide area network) or the internet (figure 1, numeral 4 and 5; "alternately, services may be delivered from World Wide Web ..." at paragraph 0029).

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Regarding claim 32, the displays are connected indirectly to the signal source by a remote processor connected to the network (figure 1, numerals 10 are set-top-boxes connected to the cable network).

### The Combination

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the digital cable network taught by Lawrence, in order to transmit the television pictures to the users of the McCormick system, in order to provide the secure, reliable, high speed and quality transmission of the pictures associated with “digital broadcasts” (e.g., Lawrence, paragraph 0027).

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Gottfried et al. (US 6,483,644 B1) and Baxes (image processing text, titled “Digital Image Processing”).

While Gottfried discloses digital image processing to improve image quality (“digital image manipulation” at column 6, line 46; “resolution of the interwoven image is increased” at line 57), Gottfried does not teach contrast enhancement.

Baxes teaches digital contrast enhancement (pages 73-75) to achieve a “well balanced” image so as to “recreate the exact characteristics of that scene” (page 75, top paragraph).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Gottfried's digital image manipulation algorithm, to include digital

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contrast enhancement as taught by Baxes, to improve the overall image balance and thereby recreate, as close as possible, the characteristics of the original scene.

17. Claims 8, 9, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Gottfried et al. (US 6,483,644 B1) and Lawrence et al. (US 2003/0137688 A1).

Regarding claims 8 and 9, while Gottfried discloses the electronic storage and projection of the interwoven images through a display device (i.e., column 1, lines 53-65), Gottfried does not teach conveying the image through a network, including a local area network or the internet.

Lawrence teaches a digital network whereby pictures can be sent to and from users of the network to other users via the internet (figure 1, and as described above).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to transmit the reconstructed (i.e., interwoven) pictures of Gottfried, to user's who wish to view the pictures over a network, such as the digital cable and internet system taught by Lawrence, in order to provide a means of propagating the pictures quickly, accurately and efficiently to others who wish to view them.

Regarding claims 13 and 14, for the same reasons and motivation above, it would have been obvious to transmit the pictures captured by Gottfried's capture system (e.g., figure 5b) over a network for processing and reconstruction at a location remote from the capture system in a manner that is quick, accurate and efficient.

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18. Claim 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Gottfried et al. (US 6,483,644 B1) and McCormick et al. (US 6,535,629 B2).

Gottfried captures a perspective image sequence (e.g., figure 5b) using a plurality of cameras arranged in an array to capture images of the object from a plurality of vantage points.

Regarding claims 17 and 18, Gottfried displays the final, reconstructed images through a LCD display device (i.e., column 1, lines 53-65).

Regarding claim 19, periodic pixels are combined by Gottfried as described in the claim 1 rejection above.

Gottfried does not teach the picture being defined by an array of lenses and a corresponding detector.

McCormick teaches a method of capturing a plurality of images from different perspective viewpoints, comprising an array of lenses receiving light from an object (figure 1, numerals 12, 14, 15 and 16 are each an array of lenses; any one of these meets the claim requirements) to generate an array of images of the object (figures 2-4), a lens position to received the array of images (figure 1, numeral 19) and to focus the images onto a detector (figure 1, numeral 21; "CCD" at column 3, line 3).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to replace the array of cameras required by Gottfried, with the image capture device taught by McCormick, in order to capture the plurality of images from different perspective because the McCormick capture device is simpler, requiring only



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one optical system and one detector, and whereby "continuity of parallax throughout the viewing angle is achieved" (McCormick, column 2, line 63) thus resulting in a more realistic, more believable reconstructed image.

19. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Gottfried et al. (US 6,483,644 B1) and McCormick et al. (US 6,535,629 B2) as applied to claim 16 above, and further in view of Lawrence et al. (US 2003/0137688 A1) as applied to claims 13 and 14 above. That is, it would have been obvious to transmit the pictures captured by Gottfried's capture system (e.g., figure 5b) over a network for processing and reconstruction at a location remote from the capture system in a manner that is quick, accurate and efficient.

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***Conclusion***

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 703-306-3037. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Brian Werner  
Patent Examiner  
Art Unit 2621  
Wednesday, October 01, 2003

A handwritten signature in black ink, appearing to be 'BW', with a long horizontal line extending to the right.

**BRIAN WERNER  
PRIMARY EXAMINER**